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to Mr. J. W. Ashby.

With the very respectful regards of
the author,

Mary Hallock Greenwalt

PULSE IN VERBAL RHYTHM.

By MARY HALLOCK-GRENEWALT,
PHILADELPHIA, PA.

[Reprinted from POET LORE, June, 1905.]

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Comments on her work as Scientist and Lecturer.

From Mr. Charlemagne Tower, U. S. Ambassador Extraordinary and Minister Plenipotentiary to Berlin:

"I congratulate you upon your presentation of this extremely interesting study."

Excerpt from the letter of Mr. A. B. Meyer, Director of the Dresden Museum, Dresden:

"A very suggestive and spirited paper."

Excerpt of letter from Mme. Fannie Bloomfield Zeisler:

"Your article on Pulse and Rhythm was read with the greatest interest. Your arguments appeal to me most strongly, and I hope you will have time to follow the subject up and give us the benefit of your investigations."

Excerpt from letter of Dr. Henry Skinner, President of the Entomological Society, Academy of Natural Sciences, Phila.:

"Your very interesting and instructive essay was duly received, and I desire to thank you very much for it. I read it with pleasure and profit. You did a lot of research along the line of entomology."

From Dr. Solomon Solis-Cohen, Philadelphia:

"How can one's whole nervous system, muscular system, organism fail to be impressed by a life-long rhythm (pre-natal as well) so important as the heart's? Think, too, of the meaning, the exaltation of function regularly recurring with the advent of new blood."

"Yes, you have listened to Beethoven's heart beats from beyond the stars! Thank you very much for your illuminating study."

Excerpt from the letter of Edmund C. Stedman:

"Let me assure you that I find your thesis most suggestive and very interesting. My instinct long has been that in our most ideal movements and evasions we are subject to the whirl of the universe and to the time beats of our own hearts. What I could add would be the experience of the natural rhythmist who had lain in bed for months with his heart intermitting,—skipping the half of every third beat and the whole of the fourth. This being a perfectly rhythmic sequence, I found my verse keeping step with it. As Tennyson says, 'It beat time to nothing in my distraught brain!'"

From Constantin Von Sternberg:

"The service which you have rendered Art is not a superficial one, but reaches down deep into its very fundaments, disclosing there the intimate touch of music with the very life pulse of humanity. Your work has secured for you a place among the greatest servitors of Art, a place embellished by a beautiful and fervid Art instinct which has evidently guided your investigations and aided you to recognize with the heart many things in which the mind alone might have erred."

"NO SERIOUS MUSICIAN CAN AFFORD TO DISPENSE WITH THE KNOWLEDGE OFFERED IN YOUR VALUABLE CONTRIBUTION, AND NOT FOR YOUR BUT FOR ART'S SAKE I WISH THAT IT WOULD MAKE ITS WAY QUICKLY ALL OVER THE MUSICAL WORLD."

From ST. LOUIS POST-DISPATCH:

NOTED PIANIST WHO REASONS THAT HEART BEATS AFFECT MUSIC RHYTHMS

"Hundreds of musicians are still discussing the unique lecture of Mrs. Mary Hallock-Greenewalt, given in Festival Hall at the Fair, Monday morning. Using her fingers as well as her brain to demonstrate her musical knowledge, she was considered by her hearers a marvel of scientific and novel ideas."

From THE ROCHESTER POST EXPRESS, Rochester, N. Y.:

"What determines the tempo of compositions? Is it whim, caprice, the uninfluenced imagination, a pure act of volition on the part of the composer; or is the musician sub-consciously guided by some physical mentor? That is the difficult question which Miss Hallock, well known as a pianist and writer on musical themes, has set herself to answer in the September number of the *Popular Science Monthly*. Old thinkers from the time of the Greek philosophers to the physician Ayleema,

and Savonarola, the theologian, have dreamed that there was some subtle connection between musical rhythm and the arterial pulsation. **THAT IOEA MISS HALLOCK RAISES FROM THE LEVEL OF CONJECTURE TO THE HEIGHTS OF A HYPOTHESIS, SUPPORTED BY EXPERIMENT."**

From the COLORADO SPRINGS GAZETTE, Colorado Springs, Col.:

"MISS HALLOCK IS A CONVINCING AND ENGAGING SPEAKER, AND IS IN RAPPORT WITH HER AUDIENCE AT ONCE. THE MUSICAL ILLUSTRATIONS WERE MAGNIFICENTLY RENDERED, and all who heard Miss Hallock could not but believe that she had solved the subtle link between musical rhythm and the arterial pulsation. The subject was charmingly illustrated in a variety of ways: a Barcarolle of Rubinstein and Brahms Rhapsodie were executed with a rare delicacy of touch and nicely of feeling. By special request Miss Hallock played Chopin's Nocturne in G major in so finished a manner as to evidence her complete mastery of the instrument. As she retired from the stage the audience showered upon her appreciative applause."

From THE MUSICAL LEADER, Chicago:

"Miss Mary Hallock, of Philadelphia, has discovered the affiliation between Heart and Brain, and musical and verbal rhythm. Her lecture given at St. Louis is described as unique, and **ADMIRABLY SUITED FOR AMATEUR CLUBS IN SEARCH OF SOMETHING NEW AND NICE IN UP-TO-DATE IOEAS."**

From the DAILY HERALD, Carlisle, Pa.:

"Miss Hallock's interesting theory may be placed in the line of distinct scientific achievement, and consequently from a physiological and psychological point of view is extremely suggestive of possible modification in musical theory and aesthetics. That Miss Hallock succeeded in holding the attention of her audience throughout the exposition of her somewhat difficult subject, is conclusive proof, not only of the power and value of the theory and of her effective and interesting presentation of it, but as well of her own most charming personality."

From THE REVIEW OF REVIEWS:

"Are musical composers unconsciously guided by the beat of the pulse? Miss Mary E. Hallock in the *Popular Science Monthly* presents many interesting facts bearing on the subject."

From AMERICAN MEDICINE:

"A new and interesting dependence of the rhythms of human and animal life upon the physiologic pulse has been suggested by Miss Mary E. Hallock, the Philadelphia pianist. Music is an almost perfect illustration of the direct creative effort of the human brain, and Miss Hallock has opened up a valuable field of study."

From MEDICAL NEWS:

"In the *Popular Science Monthly* for September, 1903, there is an article on 'Pulse and Rhythm,' by Mary Hallock, that is calculated to be of great interest to physicians. The whole question is one of those highly interesting physiologico-psychological problems that deserves to be studied more carefully than in the past, for it has within it the promise of interesting relationships hitherto unsuspected."

From DER TAG, Berlin, Germany:

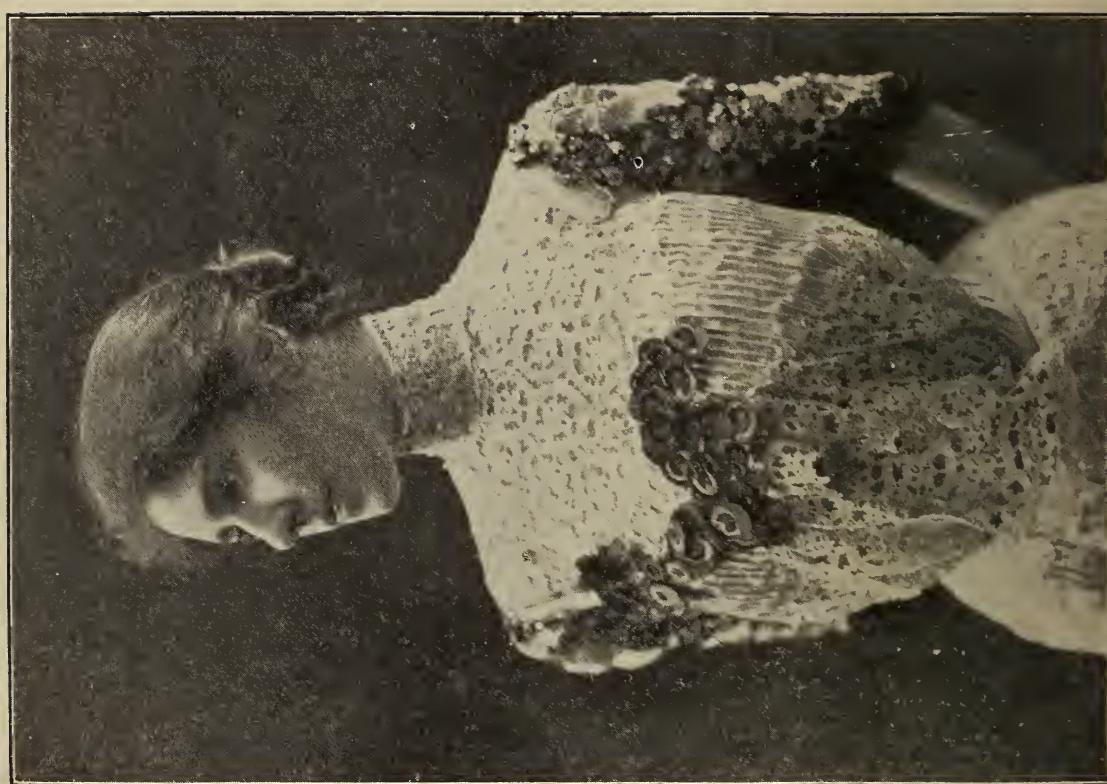
"In her paper on 'Pulse and Rhythm,' Miss Hallock has made some very interesting observations."

From DIE DEUTSCHE HAUSFRAUEN-ZEITUNG:

"In 'Pulse and Rhythm,' Miss Hallock comes to the very probable conclusion that most rhythmic phenomena can be traced back to the pulse beat."

From THE CHICAGO TRIBUNE:

"Miss Mary Hallock, a pianist and writer, contributes an article to a scientific magazine which has attracted wide notice among musicians."



[Reprinted from *POET LORE*, June, 1905.]

PULSE IN VERBAL RHYTHM.

BY MARY HALLOCK-GREENEWALT
PHILADELPHIA, PA.

A GREAT poet and at the same time great musician has shown by scientific analysis that poetry is such things as music is made of. Accent, rhythm, tone-color, intensity, and pitch, all are present in spoken verse. Some of them, as every musician knows, can be measured by mathematical accuracy; some of them cannot. One species of accurate measure, far reaching in its meaning, escaped Mr. Lanier's attention.

Simply, trenchantly, this poet, musician, scientist proved his points; the firmest lightest stroke settling once and for all the fact that verbal rhythm is bred of quantity, not born of accent. Regular time dimensions measured as by the clock stand at the root of verbal rhythm just as they are the life and breath of music. For why then should pauses within and without the lines be part and parcel of the rhythmic form? Accent cannot exist where sounds are not. Silence can supply nothing but time. This way he arrives at a signal truth, holding within itself the proof that the most exalted poetic workmanship stands with its 'feet' on a Mother Goose floor. All that we may say of the quantitative rhythm of a nursery rhyme will be found equally true of the iambics of Shakespeare's blank verse.

In reciting 'Jack and Jill' then, or 'Mother Hubbard,' or 'Mary, Mary, Quite Contrary,' the same amount of time measured as by the clock elapses between every pair of syllables pointed to as vital to the rhythm. Prosodists have not yet agreed as to what accent in verse really is. A syllable may be raised above its fellows by alliteration, intensity, tone-color, pitch, or any one of a dozen ways used similarly in music to bring out a note.

In Jack and Jill no one will deny that these syllables are:

Jack and Jill went up the hill
To fetch a pail of water;
Jack fell down and broke his crown
And Jill came tumbling after.

PULSE IN VERBAL RHYTHM

No demonstration is needed to show that at discretion each unit of time between these accented syllables may be made faster or slower at will.

In music this shifting of the tempo is the spice of interpretation. One who inclines his attention to the pianola has told me that change in the tempo lever alone made expression; whereas change in the intensity lever alone did not. At one moment we may feel like humming a few bars of a Brahms Rhapsody at the rate of seventy-six beats to the minute, again at eighty and again at eighty-eight in whatever motion may best fill the mood of the moment.

These time rates are mathematically gaugeable by an instrument in universal use among musicians called the metronome. And just as a portrait magnified to gigantic proportions destroys the likeness, just so are the time variations which can uphold the feeling and not distort the form confined in music to certain well defined limits.

Strangely enough the quantities of verse sound natural only when uttered within these same circumscribed time rates. No elocutionist will deny that different interpretations require a varying energy of word emission. Or that to linger over a verse of sentiment is as natural as to pass quickly over the words of an energetic and angry dismissal. Because a metronome is not in more universal use the second hand of a watch or clock will be made to answer every purpose of illustration.

Recited at a 'second' rate Jack and Jill will be found an old friend, possible and natural. With this rate doubled, however, with two quantities occupying the time space of one before an objection at once appears. Only the more or less nimble tongue can voice the syllables so fast. A little faster and the speed strikes the reciter dumb. A syllable is a tone. As a syllable-making implement the tongue is the least nimble of musical instruments. Whereas in pianism the necessity is not unusual for playing fourteen to sixteen notes a second, the utmost that a tongue can do in that line, and that for only a minute, is to reach eight syllables in the same time.

Clearly time is necessary to verse. Too much of it is disastrous. Uttered at the rate of fifty quantities a minute an impossible drone meets the ear. One hundred and twenty quantities a minute, whether the quantity be composed of three or four syllables, is unnaturally fast; so that, roughly speaking, the limit of speed at which verbal quantities are possible stands at a time rate of between sixty and one hundred beats to the minute. Just this is true of musical rhythms. Just this scope of beat confronts the physician when he feels the normal pulse.

Some statements of the oldest reporter of the Senate (See 'Dr.

North and His Friends,' by Dr. S. Weir Mitchell) confirm this testimony of a time measuring instrument. He says:

'Speech at the rate of three syllables a second is slow; below that number wearisome to listen to. The fastest talkers in the Senate reach a speed of four and a half syllables a second. For a single minute, uneducated Irish women and negroes excited on the witness stand can reach a speed of eight syllables a second.'

Slower than one quantity, three syllables or their value a second, verse is wearisome to listen to; in double quick time, unusual and rare, if not impossible, a rate of beat synchronous with the heart's considered in its cycle of daily unpathologic variation.

The comparison is fraught with meaning. The idea that inward beat not only suggests but interprets the outward externalization furnishes the one possible solution to many a verbal riddle.

To that most practical of rhythmists, the pianist, it is one of the great mysteries of the world how the written words of a verse quite by themselves suggest orderly rhythm to the reader. What is it in Jack and Jill which makes the word 'water' suddenly demand the time taken by four syllables before? In asking for a glass of water the word is certainly more concisely uttered, even if in certain parts of the country it were not pronounced 'watter.' 'After' in the fourth line is different in length from 'after' in 'After the Ball.'

Take also the following primitive verse from Gummere's 'The Beginnings of Poetry,' more useful than pretty in this connection. How from the punctuation can the quantities be determined as the bar lines undoubtedly indicate them?

Nine are washing the | lye
 Nine. |
 Nine are washing it, |
 Nine are rubbing it, |
 Pretty Marion | in the shade, |
 Pretty Marion, | |
 Let us to the | fountain go. |

By what verbal logic does the preposition 'in' receive an accent in the fifth line? Does anything in the page mark the spot where illogical accent marks the rhythmic limits? And, generally speaking, what denotes the place where change from iambus to anapest fugitively occurs? So practical as the musician the poet has not been.

Rhythm is time bounded regularly. In the insect's call it is the fall of the chirp, chirp, chirp which measures off the time; in poetry and music it is the regularly recurring accent.

Sometimes the divisions of time are quite unornamented. Such a rhythm is that of the Long Meter Doxology, the simplest rhythm, the rhythm of the insect's chirp. Sometimes there is the slightest possible tracery within the dimensions.

The introductory note which ushers in the beat of a guinea hen's cackle marks this bird as a master of the iambic form:

cack le, cack le, cack le.

From this rhythm to the traceries within traceries of a Chopin nocturne is a long step indeed.

Music developed these rhythmic possibilities because the musician began by accounting for every fragment of time within his spaces, by symbols invented for this orderly purpose. The poet failed to do this and the omission dug a grave for poetic rhythm. In the travail of workmanship the rhythmic light has paled and faded and all but died. The poet lives only because pulse beating within other organisms has marked for them his order. The suggestion may do something to clear the mystery surrounding the quantitative rhythm of old Latin and Greek prose. A tradition which never could have died had literature been wise and learned from music.

Physiologically speaking, imagine the heart of the living world laid bare. Keep in mind the 'exaltation of function' it throws regularly into every one of its parts, and this on an average of seventy-six times a minute. Conceive if you can the force with which it pumps a circuit of life through the butterfly, through the panther, so fast, so steadily as seconds are ticked by the clock. See how recurrently it buffets the brain. Is it strange if with such rigorous instruction the heart should have taught the head regular recurrence?

Not only this. Pygmy passageways simultaneously check the flow of blood from the heart, rudely distending the arterial walls at the capillary juncture. Is it inconceivable that this inhibited energy jostles the nerves to suggesting compensating action? Restricted freedom here also tortures the body forward; in this case to poetry, to music and the dance. The mother rocks her infant because regular motion is required by her own organism, not the child's. We are rhythmic because the physical man demands it.

But the heart buffets the nervous system with double blows. It says, here is one for you for contraction, here is one for you for expansion. Does the poet deal it out similarly to the world? In answer one has but to paraphrase that 'with a lub dub, lub dub, lub dub, every long poem and nearly every important short poem in the

English language is written.' For what is a lub dub beat but a 3/8 rhythm with the middle 1/8 left out?

'As I wandered weak and weary.'

'How sweet the moonlight sleeps upon this bank!'

The examples could be multiplied indefinitely.

Between the two sounds of the heart a little less than a third of a second, one-third of the whole heart beat or thereabouts passes. The iambus enters in and out, just so, as rhythms go, by the clock.

As to the extent of 3/8 rhythms listen to what Mr. Lanier has to say:

'I think no circumstance in the history of æsthetics is so curious as the overpowering passion for 3-rhythms as opposed to 4-rhythms. From the beginning of English poetry with the 'Song of The Traveller,' which we may perhaps refer to the sixth century, or, speaking within the more certain bounds of poetic history, from our father Cædmon,—through all the wonderful list down to the present day, every long poem and nearly every short poem in the English language has been written in some form of 3-rhythm.'

A German writer compiles a table of the world's poetry, draws a hunger curve and a thirst curve, and asks why there is so much poetry that deals with drinking and so little that deals with eating. The former is the more spiritual, to be sure, but the stimulus increases the force of the heart's action and makes more insistent the recurrent will. 'Out of the mouth the heart speaketh' in no metaphoric sense.

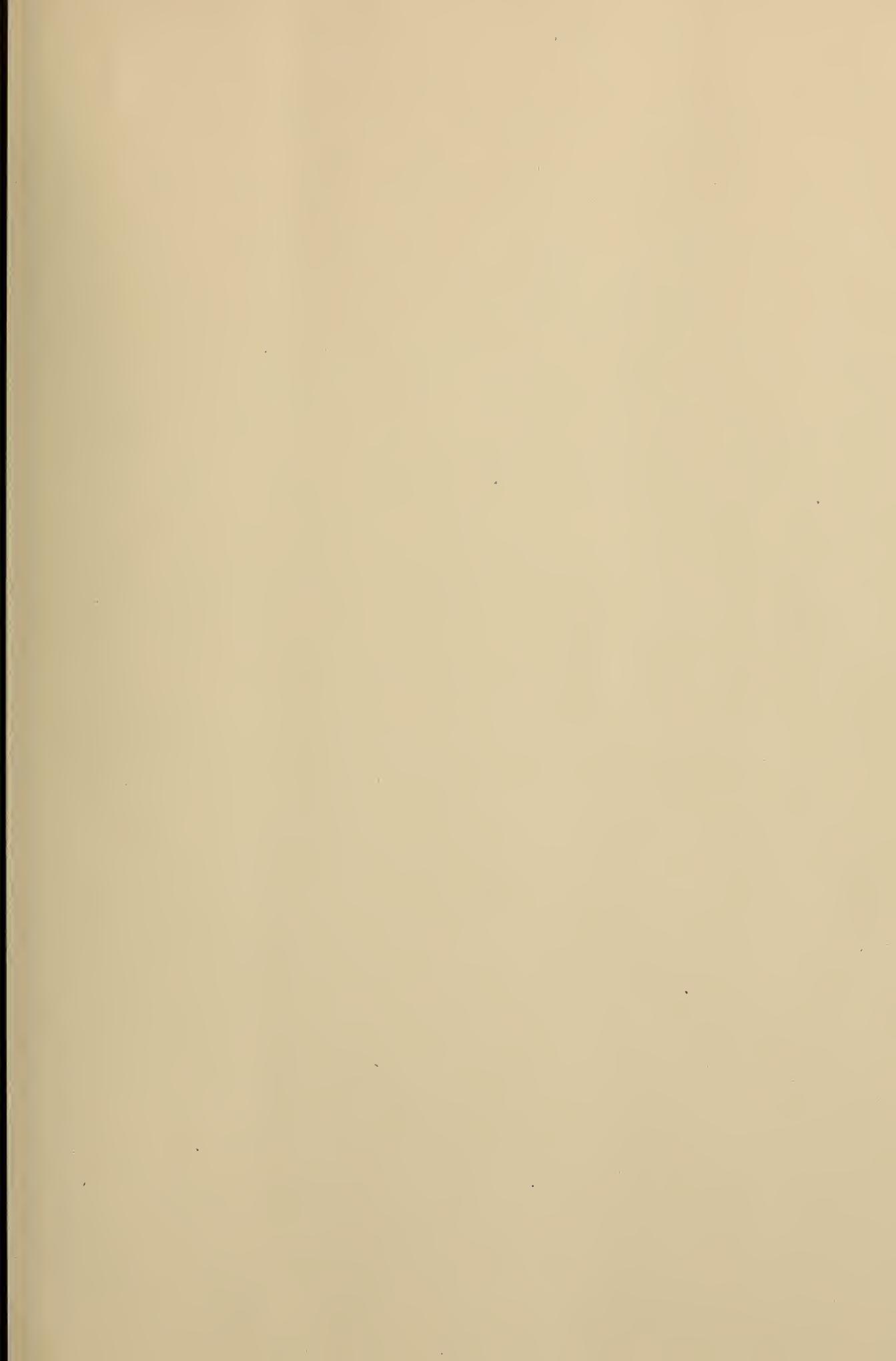
The ancients proved that there was no time in poetry in the usual fallacy fashion. They said, time must be either past, present or future. Admittedly neither past nor future time is. Present time may be either divisible or indivisible, against both of which there are objections. Therefore neither in the broad nor narrow sense is there time. They lost sight of one fact. The time of verse is remeasured, remanufactured at every new reciting. Memory welds the parts into a cohesive picture. Is this time portioned out similarly by different people in different lands at different times? Clearly so. The Frenchman's verse is not impossible of utterance to the German, neither is the Swede debarred from the English poem. A weary drone is necessary for none. As a matter of fact the heart of the entire animal world beats within similar limits.* From the salamander to man and thence

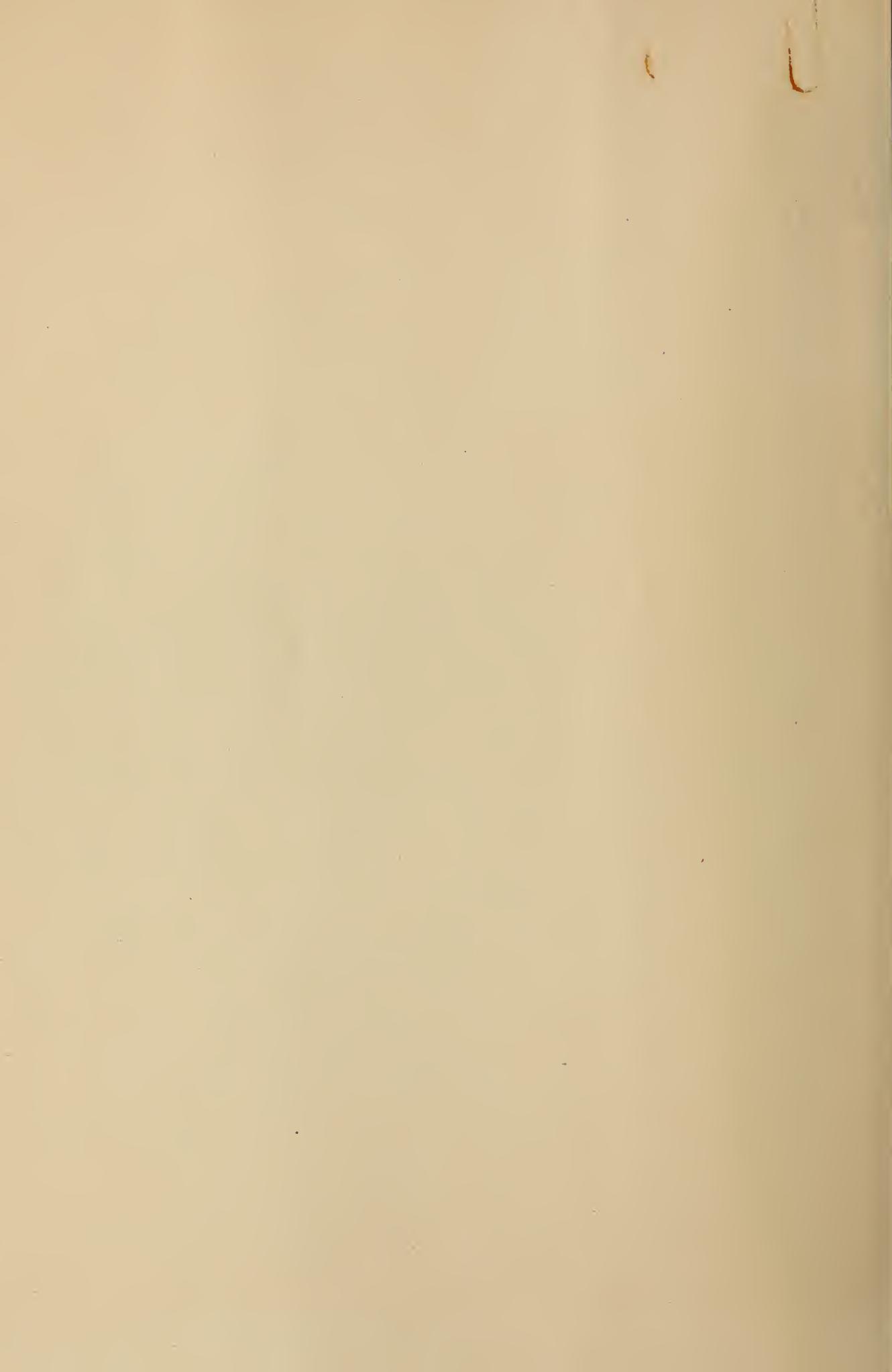
* *De la Propulsion du Sang Considerée dans la Série Animale.* Bull. de l'Acad. de Med., 1840, Vol. V, p. 442, par. M. Dubois (d'Amiens).

to the butterfly the heart is uniform in its throb variations. One perfect communal feeling, one perfect communal sensation. Is it not communal action which has been held to be at the root of our sense of rhythm?* In the study of history on this field of battle two factions have pitched their tents. One army says, the superior individual arises, the mass, the clan, the tribe imitates and so a people progresses. The other holds that there is a common soul within the clan, that the products from the sum of the experiences of many cannot be explained by products of the individual's mind. So far as communal rhythm is concerned, imitation by each individual of the beat he feels within would create a spontaneous generation of rhythmic expression in the mass, on account of the similarity in the beat which, being the closest to them, all could not help but imitate. Variations in this beat are constantly present. Here also, 'Of the soul the body from doth take.' Happiness, exhilaration, weariness, all raise and lower the cardiac rhythm. By the brain unaided these differences (thirty beats more or less per minute) can rather be felt than measured.

There is a species of worm whose body is a lantern. Having feeling, having will, it glows rhythmically, and within the time rate of the general zoölogical pulse, as modified by exhilaration and lowered by repose. Let not the humblest poet despair. Some glow-worm afar celebrates his every measure with a gleam of fire.

* The Beginnings of Poetry—Gummere.







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